

WHAT IS CLAIMED IS:

1. A cooling roll for manufacturing a ribbon-shaped magnetic material by colliding a molten alloy to a circumferential surface of the cooling roll so as to cool and then solidify it, wherein the circumferential surface of the cooling roll has dimple correcting means for dividing dimples to be produced on a roll contact surface of the ribbon-shaped magnetic material which is in contact with the circumferential surface of the cooling roll.

2. The cooling roll as claimed in claim 1, wherein the cooling roll includes a roll base and an outer surface layer provided on an outer peripheral portion of the roll base, and the outer surface layer has said dimple correcting means.

3. The cooling roll as claimed in claim 2, wherein the outer surface layer of the cooling roll is formed of a material having a heat conductivity lower than the heat conductivity of the structural material of the roll base at or around room temperature.

4. The cooling roll as claimed in claim 2, wherein the outer surface layer of the cooling roll is formed of a ceramic.

5. The cooling roll as claimed in claim 2, wherein the outer surface layer of the cooling roll is formed of a material having a heat conductivity equal to or less than $80\text{Wm}^{-1}\text{K}^{-1}$ at or around room temperature.

6. The cooling roll as claimed in claim 2, wherein the other surface layer of the cooling roll is formed of a material having a coefficient of thermal expansion in a range of $3.5 - 18[\times 10^{-6}\text{K}^{-1}]$ at or around room temperature.

7. The cooling roll as claimed in claim 2, wherein the average thickness of the outer surface layer of the cooling roll is 0.5 to $50\mu\text{m}$.

8. The cooling roll as claimed in claim 2, wherein the outer surface layer of the cooling roll is manufactured without experiencing a machining process.

9. The cooling roll as claimed in claim 1, wherein the dimple correcting means includes at least one ridge provided on the circumferential surface of the cooling roll.

10. The cooling roll as claimed in claim 9, wherein an average width of the ridge is $0.5 - 95\mu\text{m}$.

11. The cooling roll as claimed in claim 9, wherein the at least one ridge is provided by forming at least one groove in the circumferential surface of the cooling roll.

12. The cooling roll as claimed in claim 11, wherein an average width of the groove is $0.5 - 80\mu\text{m}$.

13. The cooling roll as claimed in claim 11, wherein an average height of the ridge or an average depth of the groove is $0.5 - 20\mu\text{m}$.

14. The cooling roll as claimed in claim 11, wherein the ridge or groove is formed spirally with respect to the rotation axis of the cooling roll.

15. The cooling roll as claimed in claim 11, wherein the at least one ridge or groove includes a plurality of ridges or grooves which are arranged in parallel with each other through an average pitch of $0.5 - 100\mu\text{m}$.

16. The cooling roll as claimed in claim 9, wherein a ratio of a projected area of the ridge or groove with respect to a projected area of the circumferential surface is equal to or greater than 10%.

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17. A ribbon-shaped magnetic material which is manufactured by colliding a molten alloy to a circumferential surface of a cooling roll so as to cool and then solidify it, wherein the circumferential surface of the cooling roll has dimple correcting means for dividing dimples to be produced on a roll contact surface of the ribbon-shaped magnetic material which is in contact with the circumferential surface of the cooling roll.

18. The ribbon-shaped magnetic material as claimed in claim 17 wherein grooves or ridges are formed in the roll contact surface so that produced dimples are divided by the grooves or ridges.

19. The ribbon-shaped magnetic material as claimed in claim 17, wherein the dimples produced on the roll contact surface of the ribbon-shaped magnetic material upon solidification thereof include huge dimples each having an area equal to or greater than $2000\mu\text{m}^2$, in which the ratio of an area in the roll contact surface occupied by thus produced huge dimples with respect to a total area of the roll contact surface of the ribbon-shaped magnetic material is equal to or less than 10%.

20. The ribbon-shaped magnetic material as claimed in claim 17, wherein the division of the dimples to be produced is carried out by transferring a shape of at least a part of the circumferential surface of the cooling roll to the roll contact surface of the ribbon-shaped magnetic material.

21. The ribbon-shaped magnetic material as claimed in claim 16, wherein an average thickness of the ribbon-shaped magnetic material is 8 - 50 μm .

22. A magnetic powder which is obtained by milling a ribbon-shaped magnetic material which is manufacturing by colliding a molten alloy to a circumferential surface of a cooling roll so as to a cool and then solidify it, wherein the circumferential surface of the cooling roll has dimple correcting means for dividing dimples to be produced on a roll contact surface of the ribbon-

shaped magnetic material which is in contact with the circumferential surface of the cooling roll.

23. The magnetic powder as claimed in claim 22, wherein the magnetic powder is subjected to at least one heat treatment during or after a manufacturing process thereof.

24. The magnetic powder as claimed in claim 22, wherein a mean particle size of the magnetic powder is 1 - 300 μ m.

25. The magnetic powder as claimed in claim 22, wherein the magnetic powder has a composite structure composed of a hard magnetic phase and a soft magnetic phase.

26. The magnetic powder as claimed in claim 25, wherein an average crystal grain size of each of the hard magnetic phase and the soft magnetic phase is 1 - 100 nm.

27. A bonded magnet which is manufactured by binding a magnetic powder which is obtained by milling a ribbon-shaped magnetic material which is manufactured by colliding a molten alloy to a circumferential surface of a cooling roll so as to cool and then solidify it, wherein the circumferential surface of the cooling roll has dimple correcting means for dividing dimples to be produced on a roll contact surface of the ribbon-shaped magnetic material which is in contact with the circumferential surface of the cooling roll.

28. The bonded magnet as claimed in claim 27, wherein an intrinsic coercive force (H_{CJ}) of the bonded magnet at room temperature lies within a range of 320 - 1200 kA/m.

29. The bonded magnet as claimed in claim 27, wherein a maximum magnetic energy product $(BH)_{\max}$ of the bonded magnet is equal to or greater than 40kJ/m³.

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